## REMARKS

This paper is responsive to an Office Action dated July 31, 2001. Prior to this amendment claims 1-25 were pending. After amendments to claims 1, 12-13, and 24-25, claims 1-25 remain pending.

In Section 7 of the Office Action, the Examiner stated that claims 12-13 and 24-25 would be allowable if rewritten in independent from including all of the limitations of the base claim and any intervening claims. The Applicant thanks the Examiner for this notice of allowable subject matter. The Applicant has amended claims 12-13 and 24-25 as indicated in the Office Action. The Applicant asserts that claims 12-13 and 24-25 are now in condition for allowance.

In Section 4 of the Office action, claims 1, 15, 20 have been rejected under 35 U.S.C. 102(e) as being anticipated by Varadan et al. (6,333,719). This rejection is traversed as follows.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

Regarding claim 1, Varadan does not show a resistor and an inductor arranged as a matching circuit. The Office Action states in Section 4 that Varadan shows "a capacitor 13 and an inductor 18 arranged as a matching circuit." The Applicant respectfully disagrees. Varadan shows a capacitor 13 and an inductor 18 in Fig. 14, but the capacitor 13 and the inductor 18 are not arranged as a matching circuit.

A matching circuit is circuit that adjusts an input impedence to match an output impedence. The capacitor 13 and inductor 18 of Varadan do not satisfy this definition for two reasons.

First, the capacitor 13 and the inductor 18 are not coupled together. They are on opposite sides of the device in question in Fig. 4, that is, the feeder-resonator element 11.

For the capacitor 13 and the inductor 18 to "be arranged as a matching circuit," they would have to be on the same side as the feeder-resonator element. That is, the capacitor 13 and the inductor 18 would both have to be either at the input or the output of the feeder-resonator element 11 for them to be arranged as a matching circuit.

Second, the capacitor 13 is explicitly referred to as "a DC capacitor block 13," which "prevents high DC voltage from destroying the RF signal sources. Varadan at Col. 3, para. 5. This is known as a DC blocking capacitor. A DC blocking capacitor isolates a DC signal from an AC signal. A DC blocking capacitor is not a matching circuit.

Third, the "inductor element 18 prevents the RF signal from leaking into DC source 16." Varadan at Col. 3, para. 5. This is similar to the purpose of a DC blocking capacitor. But, instead of isolating the DC source from the RF signal, it isolates the RF singal from the DC source. Thus, the inductor 18 does not serve the function of a matching circuit and is not a matching circuit.

Since Varadan does not show the inductor and capacitor arranged as a matching circuit as in the claimed invention, the Applicant respectfully requests that the rejection be withdrawn.

In Section 6 of the Office Action, claims 2-11, 14, 16-19 and 21-23 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Varadan et al. This rejection is traversed as follows. Applicant respectfully asserts that each of claims 2-11, 14, 16-19 and 21-23 are allowable, since they depend from claim 1, 15, or 20. The rejections of claims 1, 15, and 20 have been discussed above. Since each of claims 2-11, 14, 16-19 and 21-23 depend from claims that Applicant asserts are now in condition for allowance, Applicant asserts that claims 2-11, 14, 16-19 and 21-23 are also allowable.

Applicant respectfully asserts that claims 2-11 are allowable for the following additional reasons. The Office Action does not state any reason why these claims are considered obvious.

> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally availabe to one of

ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

MPEP § 2144.

The Office Action does list any of the three requirements for a *prima facie* case of obviousness. First, the Office Action does not show a motivation to combine the elements, even if the elements themselves were known in the art, which is not the case, as described below.

Second, the Office Action does not show any evidence of a reasonable expectation of success.

Third, regarding the requirement that the prior art must teach all of the claim limitations, the Office Action relies on an assertion that "Varadan et al. fail to specifically teach the quality factor of the matchin circuit," but that the quality factor of the matching circuit "would have been obvious in the art."

High quality factors on ferro-electric tunable matching circuits are not obvious in the art. Applicant respectfully points out that specific quality factors are claimed in claims 2-11. The quality factors claimed range from 80 to 180. Any possible prior art matching circuits could not have had a quality factor greater than 80, and especially not greater than 180. It may be obvious to have a quality factor, but it is not obvious to have a quality factor greater than 80. For this reason, applicant asserts that claims 2-11 are in condition for allowance.

Applicant respectfully asserts that claim 14 is allowable for the following additional reasons. First, the Office Action does not show a motivation to combine the elements, even if the elements themselves were known in the art, which is not the case, as described below.

Second, the Office Action does not show any evidence of a reasonable expectation of success.

Third, the Office Action does not state that all of the claim limitations in claim 14 are present in the prior art, even if combined with any well known prior art. The Office

Action states in Section 6 that, "Antennas and their elements are routinely 'frequency scaled' and thus claims limitations are obvious design choices of wide bandwidth and matching the variation with frequency as of interest."

Regarding the statement in the Office Action in Section 6 that, "Antennas and their elements are routinely 'frequency scaled' and thus claims limitations are obvious design choices of wide bandwidth and matching the variation with frequency as of interest," Applicant is uncertain whether the Office Action intends this as a rejection based on common knowledge in the art or "well-known" prior art, as described in the MPEP § 2144.03. Applicant is also uncertain what is being noticed in the prior art, and is therefore uncertain as to what statement Applicant must traverse under MPEP § 2144.03.

Applicant believes that the statement is intended to state that it is well known in the the art to design an antenna with a variable matching circuit that varies an electrical match as an operating frequency of the antenna varies. Applicant traverses this statement, below. If the Office Action intended to take notice of some other assertion, Applicant respectfully requests a communication stating what assertion is being taken official notice of, as Applicant would like the opportunity to traverse any official notice made with respect to Section 6 of the Office Action.

Further, even if variable matching circuits for antennas were well known in the art, this would not make claim 14 obvious. Claim 14 claims a "control source compris[ing] a lookup table and var[ying] the control signal responsive to a value in the lookup table." The Office Action shows no reason why using a look-up table to control a variable matching circuit is obvious.

Applicant respectfully asserts that claims 16-19 are allowable for the following additional reasons.

As described above, with reference to claim 2-11, the Office Action may be attempting to take official notice of varying antenna match. Even if varying an antenna match were obvious, which Applicant contests, that would not make the matching circuit

configurations in claims 16-19 obvious. To make a case of obviousness, all three of the above-stated elements must be shown. None are shown as to claims 16-19.

Applicant respectfully asserts that claims 21-23 are allowable for the following additional reason. The Office Action does not state any reason why these claims are considered obvious. The same arguments applied regarding claims 16-19, above, apply regarding claims 21-23.

Further, Applicant respectfully asserts that claims 21-23 are allowable for the following additional reason. Claims 21-23 relate to amplifiers. Varadan et al. relates to antennas. Varying a matching circuit of a power amplifier would not be obvious even if varying a matching circuit of an antenna were obvious. The challenges and advantages are different when dealing with amplifiers as compared to antennas.

## CONCLUSION

In sum, Applicant has amended claims 1, 2, 12-13, and 24-25. Applicant thanks the Examiner for the notice of allowable subject matter in claims 12-13 and 24-25. Applicant has amended claims 12-13 and 24-25 in independent form including all of the limitations of the base claim and any intervening claims. Applicant respectfully asserts that claims 1-25 are in condition for allowance. Applicant respectfully requests reconsideration.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned **VERSION WITH MARKINGS TO SHOW CHANGES MADE.**

Respectfully submitted October 31, 2002. Please address any questions or comments to the undersigned.

Sincerely,

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## VERSION WITH MARKINGS TO SHOW CHANGES MADE

The amendments to the claims are illustrated below with underlined text representing what has been added and bracketed text representing what has been deleted.

**In the Claims:**

Claims 1, 2, 12, 13, 24 and 25 have been amended as marked below:

1. (Amended Once) A communication device comprising:

a capacitive element[or] and an inductive element[or] arranged as a matching circuit, the matching circuit having an impedance;

a ferro-electric material positioned to adjust a value that is a member of the group consisting of a capacitance value of the capacitive element[or] and an inductance value of the inductive element[or];

a control line operably connected to the ferro-electric material;

a control source electrically connected to the control line, the control source configured to transmit a control signal on the control line;

wherein the ferro-electric material, responsive to the control signal, adjusts the value to change the impedance of the matching circuit.

2. (Amended Once) The communication device of claim 1, wherein [a wherein] the quality factor of the matching circuit, when operated in a temperature range between about –50 degrees Celsius and 100 degrees Celsius, is greater than about 80 in a frequency range between 0.25 GHz and 7.0 GHz.

12. (Amended Once) A[The] communication device [of claim 1, wherein] comprising:

a capacitive element and an inductive element arranged as a matching circuit, the matching circuit having an impedance;

a ferro-electric material positioned to adjust a value that is a member of the group consisting of a capacitance value of the capacitive element and an inductance value of the inductive element;

a control line operably connected to the ferro-electric material;

a control source electrically connected to the control line, the control source configured to transmit a control signal on the control line;

wherein:

the ferro-electric material, responsive to the control signal, adjusts the value to change the impedance of the matching circuit, and the control signal comprises a direct current voltage;

the control source is coupled to a band select signal, the band select signal comprising a signal identifying a band in which the matching circuit is to operate; and the control source comprises:

a lookup table comprising a number representing the direct current voltage value corresponding to the band in which the matching circuit is to operate; and

a voltage source for generating the direct current voltage responsive to the number representing the direct current voltage value.

13. (Amended Once) A[The] communication device comprising:[of claim 1,]

a capacitive element and an inductive element arranged as a matching circuit, the matching circuit having an impedance;

a ferro-electric material positioned to adjust a value that is a member of the

group consisting of a capacitance value of the capacitive element and an inductance value of the inductive element;

a control line operably connected to the ferro-electric material;

a control source electrically connected to the control line, the control source configured to transmit a control signal on the control line;

wherein the ferro-electric material, responsive to the control signal, adjusts the value to change the impedance of the matching circuit, and

wherein the control source comprises a power detector which detects a power level of an RF signal and varies the control signal responsive to the power level of the RF signal.

24. (Amended Once) A[The] communication device [of claim 1, further]comprising:

a capacitive element and an inductive element arranged as a matching circuit, the matching circuit having an impedance;

a ferro-electric material positioned to adjust a value that is a member of the group consisting of a capacitance value of the capacitive element and an inductance value of the inductive element;

a control line operably connected to the ferro-electric material;

a control source electrically connected to the control line, the control source configured to transmit a control signal on the control line;

an antenna coupled to a first port of the matching circuit; and

a duplexer coupled to a second port of the matching circuit, and

wherein the ferro-electric material, responsive to the control signal, adjusts the value to change the impedance of the matching circuit.

25. (Amended Once) A[The] communication device [of claim 1, further]comprising:

a capacitive element and an inductive element arranged as a matching

circuit, the matching circuit having an impedance;

a ferro-electric material positioned to adjust a value that is a member of the group consisting of a capacitance value of the capacitive element and an inductance value of the inductive element;

a control line operably connected to the ferro-electric material;

a control source electrically connected to the control line, the control source configured to transmit a control signal on the control line;

an antenna coupled to a first port of the matching circuit; and

a diplexer coupled to a second port of the matching circuit, and

wherein the ferro-electric material, responsive to the control signal, adjusts the value to change the impedance of the matching circuit.